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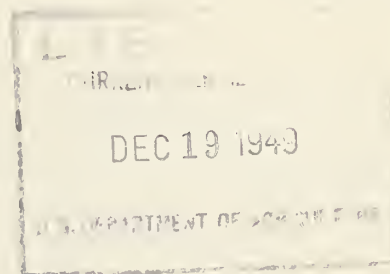


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X LIST OF PUBLICATIONS AND PATENTS WITH ABSTRACTS

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ALFALFA
FOOD PROCESSING
PECTIN, YEASTS, TARTRATE
ANTIBIOTIC SUBSTANCES AND PROTEINS
MISCELLANEOUS



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Bureau of Agricultural and Industrial Chemistry
Agricultural Research Administration
United States Department of Agriculture

ALFALFA

PRODUCTION AND UTILIZATION OF ALFALFA. F. P. Griffiths. *Economic Botany* 3(2):170-183, Apr.-June, 1949. A brief review of the history of alfalfa, its introduction into the United States, areas of major production, its composition and methods of utilization are presented. Methods of dehydration are discussed and mention is made of possibilities for industrial fractionation of alfalfa into components such as carotene, chlorophyll, protein, and fiber-free feed concentrates.

FOOD PROCESSING

HIGH-FREQUENCY-HEATING CHARACTERISTICS OF VEGETABLE TISSUES DETERMINED FROM ELECTRICAL-CONDUCTIVITY MEASUREMENTS. T. M. Shaw and J. A. Galvin, *Proc. Inst. Radio Engrs.* 37(1):83-86, Jan., 1949. Reports the electrical conductivity of potato, carrot, apple, and peach at 25°C. for frequencies between 10^3 cycles per second and 4×10^7 cycles per second and the electrical conductivity of potato at 3×10^7 cycles per second for temperatures between -80° and +30°C. These data are discussed in relation to industrial applications of the high-frequency heating method in the food and pharmaceutical industries.

HISTOLOGICAL OBSERVATIONS ON THE SEED COATS OF SUCCULENT PEAS. R. M. Reeve. *Food Research* 14(1):77-89, Jan.-Feb., 1949. A histological study of the development of peas during succulent stages, covering such phases as tissue digestion, distribution of starch grains and aldehydic materials, and methods of differentiation between aldehydes and peroxidase. It was suggested that some changes in flavor associated with delay between vining and processing may be due to natural processes of tissue resorption.

GROWTH-DEPRESSING FRACTIONS IN RAW LIMA BEANS. A. A. Klose, B. Hill, J. D. Greaves, and H. L. Fevold. *Arch. Biochem.* 22(2):215-223, June, 1949. Lima beans and various fractions contain a growth inhibitor for rats, concentrated in the crude protein fraction, from which it could be purified about ten-fold. The factor or factors were similar in certain characteristics to those of the soybean growth inhibitor. Growth was improved by addition of methionine, markedly increased by steam heating, and made approximately equal to growth on a casein control diet by a combination of the two.

Mimeographed circular:

AIC-239, TENTATIVE RECOMMENDATIONS FOR THE TREATMENT OF BERRY BOXES (HALLOCKS) TO REDUCE MOLD GROWTH. E. J. Barta and E. Love, June, 1949. Tentative recommendations for the treatment of berry-picking boxes with paraffin waxes compounded in definite proportion are made. Treating conditions are specified. Patent:

COLD PROCESSED FRUIT SPREAD. Patent No. 2,459,431 to G. Johnson and M. M. Boggs. Patented Jan. 18, 1949. Describes preparation of a gelled fruit product useful as a dessert or as a spread which retains the fresh flavor of the fruit. Retention of fresh fruit flavor is obtained by avoiding the elevated temperatures which are customary in production of ordinary jellies.

PECTIN, YEASTS, TARTRATE

SPECIFICITY AND PURIFICATION OF POLYGALACTURONASE. H. Lineweaver, R. Jang, and E. F. Jansen. *Arch. Biochem.* 20:1, 137-152, Jan., 1949. Polygalacturonase (PG), the pectic acid-hydrolyzing enzyme, was purified and found to be highly specific. The usefulness of purified PG for analytical and structure-determination purposes is indicated. The PG of one source was purified 7- to 10-fold by adsorption on alginic acid, elution, and dialysis, while the PG from another source was purified 10- to 30-fold by acid treatment, salt, and lead acetate fractionation and dialysis.

THE MINIMUM SIZE FOR THE STRUCTURAL UNIT OF PECTIN. E. F. Jansen. *Arch. Biochem.* 21:1, 149-157, March, 1949. Chemical analysis and physical measurements (osmotic pressure and diffusion rate) of the methyl glycoside of polygalacturonic methyl ester (prepared by alcoholysis of pectin or pectic acid) showed it to be essentially homogeneous with a molecular weight of approximately 6,000. Previous chemical analyses were shown to be in error due to retained alcohol.

GELATION CHARACTERISTICS OF ACID-PRECIPITATED PECTINATES. H. S. Owens, R. M. McCready, and W. D. MacLay. *Food Tech.* 3:3, 77-82, March, 1949. Methods of alkaline de-esterification and acid precipitation of low-methoxyl pectin developed at the Western Regional Research Laboratory and the gelation properties of the isolated pectinic acids are presented. A pilot plant for carrying out these procedures has been established, which includes counter-current extraction and acid precipitation of pectinic acids. Effects of calcium ion, pH, and temperature on pectinate gels, as well as results of storage tests are discussed.

TARTRATES FROM GRAPE WASTES. USE OF ANION EXCHANGERS IN A CHLORIDE-TARTRATE CYCLE. E. E. Legault, C. C. Nimmo, C. E. Herdel, and G. K. Notter. *Indus. and Eng'n. Chem.* 41(3), 465-471, March, 1949. Tartaric acid can be recovered from winery still slop by exchange adsorption on an anion exchanger in the chloride form. No cation exchanger is needed. Common salt solution serves as the regenerant. Concentration of tartrate in solution is increased 15 to 18 times over that in the original slop. High-purity calcium tartrate is the final product. Recovery data are presented from laboratory and pilot-plant scale experience. Fouling of the exchanger and means for control of the fouling are discussed.

PRODUCING YEAST FROM PROCESSING WASTES. W. D. Ramage and J. H. Thompson. *Food Packer* 30:6, 33, 44-49, May, 1949. A review of research on utilization of sugar-bearing fruit and vegetable wastes in the growth of yeast. The discussion covers work on asparagus juice, on which no pilot plant studies have been conducted, and on citrus peel press liquor and pear juice wastes. Pilot plant research on the former has been conducted at the Citrus Products Laboratory, Winter Haven, Fla., and on the latter by the Western Regional Research Laboratory.

ANTIBIOTIC SUBSTANCES AND PROTEINS

REACTION OF PROTEINS WITH FORMALDEHYDE. VII. DEMONSTRATION OF INTERMOLECULAR CROSS-LINKING. H. Fraenkel-Conrat and D. K. Mecham. *Jour. Biol. Chem.* 177 (1):477-486, Jan., 1949. Formaldehyde treatment at pH 3 to 8 and room temperature of concentrated solution of proteins containing amino groups led to marked increases in molecular weights as measured by osmotic pressure of (water-soluble) reaction products. Amino-acetylated proteins are not similarly affected. Any tendency to aggregation was minimized by performing osmotic-pressure measurements in 7 to 10 M urea solutions. It was concluded that formation of methylene bridges between amino and other reactive groups of two or more protein molecules represents chemical basis for the observed increases in molecular weights.

DETERMINATION OF TRYPSIN IN THE PRESENCE OF EGG WHITE TRYPSIN INHIBITOR AND DEMONSTRATION OF ABSENCE OF TRYPSIN. H. Lineweaver, H. Fraenkel-Conrat, and R. S. Bean. *Jour. Biol. Chem.* 177(1):205-207, Jan., 1949. A mixture of trypsin and ovomucoid (egg-white trypsin inhibitor) that exhibits no detectable proteolytic activity exhibits nearly full activity (at least 3.4) if acetylated before it is assayed, because acetylated trypsin is not inhibited by ovomucoid. Acetylation was used to show that egg white, which on a solids basis contains about 12 percent of a trypsin inhibitor, contains less than 0.002 percent trypsin.

ESSENTIAL GROUPS FOR THE INTERACTION OF OVOMUCOID (EGG WHITE TRYPSIN INHIBITOR) AND TRYPSIN, AND FOR TRYPTIC ACTIVITY. H. Fraenkel-Conrat, R. S. Bean, and H. Lineweaver. *Jour. Biol. Chem.* 177(1):385-403, Jan., 1949. The trypsin-inhibiting action of ovomucoid was unimpaired by various reagents affecting its amino groups, but intactness of carboxyl, phenolic, guanidyl, and possibly aliphatic hydroxyl and amide groups appears to be essential. Activity of crystalline trypsin was not abolished by extensive acetylation of its amino, iodination of its most reactive phenolic groups, nor esterification of its most reactive carboxyl groups. Neither reduction of disulfide bonds (at pH 5), nor reoxidation, nor coupling with imidazole groups, caused appreciable loss of activity. Groups which seemed essential were indole and amide and possibly hydroxyl and guanidyl. While acetylation of trypsin did not affect its proteolytic activity, the acetylated derivative was almost completely resistant to inhibition by ovomucoid.

ANTI-TUBERCULOUS ACTIVITY AND TOXICITY OF LUPULON FOR THE MOUSE. Y. Chin, H. H. Anderson, G. Alderton, and J. C. Lewis. *Proc. Soc. Expt. Biol. and Med.* 70(1):158-162, Jan., 1949. Lupulon, an antibiotic derived from hops, was shown to have an antitubercular action in mice. Toxic levels in mice were determined.

PILOT PLANTS. SUBTILIN PRODUCTION. J. A. Garibaldi and R. E. Feenev. *Indus. and Engin. Chem.* 41(2):432-435. Feb. 1949. The antibiotic subtilin was routinely produced by submerged culturing of *Bacillus subtilis* in a fermenter charged with 150 to 200 liters of medium. High levels of antibiotic activity and heavy growth were obtained after 11 to 12 hours on asparagus juice, supplemented asparagus juice, and a partially synthetic medium. Inorganic nitrogen supplied as ammonia adequately served as the main source of nitrogen. Purified water was essential for production in the partially synthetic medium.

ULTRAVIOLET SPECTRA OF SOME INDOLE DERIVATIVES, INCLUDING TRYPTOPHAN AND GRAMICIDIN. B. G. Edwards. *Arch. Biochem.* 21(1): 103-108. March, 1949. Absorption spectra of alcoholic solutions of gramicidin, methylol gramicidin, tryptophan, acetyl tryptophan, and 2,3,4,5-tetrahydro-4-carboline-5-carboxylic acid as well as of some indoles, methyl indoles, and methylol indoles are presented. By the use of simple observations on the ultraviolet spectrum of unhydrolyzed gramicidin and on acetyl tryptophan, the tryptophan content of gramicidin is estimated at 39.3 percent, which agrees with chemical values.

*MECHANISM OF REVERSIBLE INACTIVATION OF LYSOZYME BY IODINE AND SULFITE. H. Fraenkel-Conrat. *Fed. Proc.* 8(1) Part 8: 198-199. March, 1949. Lysozyme loses and regains activity on treatment with iodine and sulfite, respectively. From evidence obtained it was concluded that a reversibly inactivated derivative is formed first and probably contains a labile N-iodohistidine residue, whereas an irreversibly inactivated derivative is formed later by rearrangement of the N-iodohistidine into a stable C-iodo form. The concomitant iodination of some phenolic groups appeared to cause little inactivation, but when over 2 iodine equivalents (per mole lysozyme) were introduced into these groups, the activity was greatly lowered. The incipient oxidative destruction of tryptophan residues (less than one per mole) appeared reversible by early reduction.

Mimeographed circular:

AIC-231. ANTIBACTERIAL AGENTS FROM HOPS. I. C. Lewis, G. Alderton, G. F. Bailey, J. F. Carson, D. M. Reynolds, and F. Stitt. April, 1949. Reviews research on lupulon and humulon, two antibacterial agents obtainable from cones of the hop vine. Subjects covered are assay methods, antibiotic spectra, lupulon in mouse tuberculosis, and pharmacology of lupulon.

TWO ANTIFUNGAL SUBSTANCES FROM *B. subtilis* cultures. H. D. Michener and N. Snell. Arch. Biochem. 22(2):208-214, June, 1949. *Bacillus subtilis* cultures, grown for subtilin production, also produce at least two antifungal substances. One ("rhizoctonia factor") is soluble in water, absolute methanol, and 70 percent ethanol, but insoluble in ether, petroleum ether, benzene, ethyl acetate, acetone, butanol, and absolute ethanol. It diffuses through Cellophane. Active against 8 of 11 fungi and 1 of 7 yeasts at concentrations between 6 and 600 ppm. The other ("aspergillus factor") is insoluble in diethyl ether or petroleum ether but soluble in water, anhydrous butanol and anhydrous ethanol. Does not diffuse through Cellophane. Active against all of 11 test fungi and 6 of 7 yeasts in concentrations between 3.5 and 85 ppm.

Patents:

PROCESS FOR EXTRACTION AND PURIFICATION OF SUBTILIN. Patent No. 2,459,139 to K. P. Dimick, G. Alderton, J. C. Lewis, H. D. Lightbody, and H. L. Fevold. Patented Jan. 18, 1949. Subtilin, an antibiotic active against the organisms which cause anthrax, pneumonia, tuberculosis, bovine mastitis, etc., is isolated from cultures of *Bacillus subtilis* by extraction with alcohol.

DISPERSIONS OF PROTEINS IN AQUEOUS DETERGENTS. Patent No. 2,459,708 to H. P. Lundgren. Patented Jan. 18, 1949. Claims compositions containing proteinous material, chicken feathers for instance, dispersed in an aqueous solution of a synthetic detergent. These compositions are useful as spinning solutions from which to prepare synthetic protein fibers.

PROCESS FOR THE PREPARATION OF ISOCYANATE DERIVATIVES OF PROTEINS. Patent No. 2,460,980 to H. L. Fraenkel-Conrat and H. S. Olcott. Patented Feb. 8, 1949. Proteins are reacted with organic isocyanates to prepare modified protein plastics. These plastics can be molded to form useful articles such as buttons, fountain pen barrels, electrical equipment, etc.

PROCESS FOR PREPARING GLUTEN SULPHATE AND SALTS THEREOF. Patent No. 2,472,267 to H. C. Reitz. Patented June 7, 1949. Wheat gluten is reacted with sulphuric acid to produce gluten sulphate which has powerful gelling properties and is thus useful as a substitute for natural gums.

KERATIN DERIVATIVES AND PROCESS OF PREPARATION THEREOF. Patent No. 2,474,339 to W. H. Ward and C. H. Binkley. Patented June 28, 1949. A native keratin material, such as feathers, is heated with aqueous alcohol to produce keratin derivatives which are useful as plastics, adhesives, etc.

METHOD OF TREATING HYDROPHILIC COLLOIDS TO AVOID SWELLING DURING WASHING. Patent No. 2 474 367 to W. E. Ramage. Patented June 28, 1949. Hydrophilic colloids such as gluten sulphates are washed with an aqueous solution of ammonium bicarbonate. Presence of the ammonium salt prevents swelling whereby the washing process is rapid and efficient. Excess of salt is removed by volatilization.

MISCELLANEOUS

*COPPER VESSELS FOR INTRODUCING SAMPLES INTO KJELDAHL DIGESTION FLASKS. K. T. Williams. *Chem. Analyst* 37(4) 93-94 Dec., 1948. Describes successful use of small rectangular vessels formed from 9.008-inch copper sheeting for the introduction of samples into flasks in the Kjeldahl method for determination of nitrogen.

ESTERS OF *p*-HYDROXYPHENYLAMINE AS ALKYL HALIDE IDENTIFICATION DERIVATIVES. D. F. Houston. *Jour. Amer. Chem. Soc.* 71(2) 395-396, Feb., 1949. Method of preparation and melting points of a series of *p*-alkoxydiphenylamines are reported. These compounds serve as useful derivatives for the identification of alkyl halides.

MINOR OIL PRODUCING CROPS OF THE UNITED STATES. E. B. Kester. *Jour. Amer. Oil Chem. Soc.* 26(2) 65-83 Feb., 1949. A survey has been made of the more important auxiliary sources of vegetable oils from domestic crops and agricultural processing wastes including the potential tonnage available in most cases, producing areas, and type of oils obtained. The seeds of certain wild plants are discussed which could be or actually are pressed or extracted to obtain oil.

DETERMINATION OF SUGARS IN PLANT MATERIALS. USE OF DECOLORIZING CARBON IN THE FERRICYANIDE METHOD. A. Beverue. *Analyt. Chem.* 21(5) 586-587 May, 1949. Experimental data are presented on sugar adsorption properties of some commercially available charcoals as they may be used in the clarification process of plant extracts for quantitative sugar analyses. It is shown that percentage of sugar adsorption by charcoals varies with different sugars, type of carbon, and concentrations of sugar and carbon.

Patents

ISOLATION OF ACETYLESTERASE FROM CITRUS WASTE. Patent No. 2 458 171 to E. F. Jansen, E. Jang, and L. E. MacDonnell. Patented Jan. 4, 1949. Discloses technique for isolating acetylesterase, an enzyme which catalyzes hydrolysis of acetic acid esters, from citrus waste, for example orange peel.

N-ACYLATED DERIVATIVES OF GLUTAMIC ACID AND PROCESS FOR PREPARING THEM. Patent No. 2 400 779 to E. B. Kester. Patented March 8, 1949. Acid halides, such as lauroyl chloride, are reacted with glutamic acid in presence of potassium or magnesium hydroxide to prepare N-acyl glutamic acid.

DEHYDROCHLORINATION OF CHLORINATED FATTY ACIDS AND ESTERS. Patent No. 2 460 340 to G. R. Van Atta and T. C. Dietrich. Patented April 5, 1949. Unsaturated fatty acids are prepared by contacting a chlorinated fatty acid in vapor phase with a catalyst such as cobalt chloride. The products can be used to prepare soaps or drying oils.